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December 23, 1999

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

BY HAND

Magalie Roman Salas, Secretary
Federal Communications Commission
445 Twelfth Street, S.W. - Suite TW-A325
Washington, D.C. 20554

Re: WT Docket No. 99-168 and WT Docket No. 96-86
Written Ex Parte Presentation

Dear Ms. Salas:

Transmitted herewith are four copies of a written *ex parte* presentation by FreeSpace Communications (FreeSpace) for inclusion in the public record of the two above-referenced proceedings.

Sincerely,

Charles W. Logan

Enclosure

cc:

Ari Fitzgerald	Mark Schneider
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FREESPACE COMMUNICATIONS

A Comparison of the FreeSpace and Motorola Proposals for Protecting Public Safety

FreeSpace Communications (FreeSpace) and Motorola, Inc. have both proposed that the FCC establish 1.5MHz guard bands adjacent to the public safety bands to protect public safety communications from interference. Under Motorola's proposal, these guard bands would be limited to private radio uses that would be deployed through a new concept called a "band manager" and that would be subject to frequency coordination procedures as well as out-of-band emissions and power limits. FreeSpace also supports the use of frequency coordination, out-of-band emissions limits, and power limits to prevent interference to public safety communications, but opposes restrictions on the uses of the guard bands.

A fair, objective comparison of the FreeSpace and Motorola proposals shows that the FreeSpace plan offers superior protection for public safety communications. As set forth below, the FreeSpace plan supports power limits, out-of-band emissions limits and other safeguards that are considerably more stringent than those proposed by Motorola.[1]

Power Limits

FreeSpace Proposal: FreeSpace proposes a transmit power spectral density limit of 4mW/kHz for transmitters operating in the guard bands immediately adjacent to the public safety bands. This limit would apply for antenna gains up to 6dBi, with a required backoff of 1dB for every 1dB increase in antenna gain beyond this point. Therefore, in a 1.5MHz band, the transmit power *can never exceed* 8.4W ERP. In addition, because of the specific out-of-band emissions being proposed, which affect realizable channel bandwidths, transmitters will not exceed 3W ERP.

Motorola PMRS Proposal: Motorola proposes that PMRS systems operating in the guard bands comply with the power limits set forth in section 90.635 of the FCC's rules, which permits PMRS base transmitters to transmit anywhere from 65 – 1000W ERP depending on antenna height. Motorola is also proposing that PMRS mobiles be allowed 30W maximum output power.

Comparison: FreeSpace's power limits are an order of magnitude more stringent than Motorola's proposal.

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[1] This memo bases its comparison of the Motorola and FreeSpace plans on the proposed technical parameters set forth in a December 13, 1999 *ex parte* statement submitted by Motorola (*see* Letter of Steve Sharkey, Motorola, to Magalie Roman Salas, WT Docket No. 99-168 (filed Dec. 13, 1999)), and on a December 17, 1999 *ex parte* statement submitted by FreeSpace (Letter of Charles Logan, Lawler, Metzger & Milkman, to Magalie Roman Salas, WT Docket No. 99-168 (filed Dec. 17, 1999)).

Out-of-Band Emissions Limits

FreeSpace Proposal: FreeSpace supports the adoption of an out-of-band emissions limit of -57dBm in a 6.25kHz bandwidth across public safety spectrum. This can be stated equivalently with a requirement that a guard band licensee attenuate its out-of-band emissions below its transmit power by a factor of not less than 87 +10 log (P) in a 6.25 kHz bandwidth, where P is the transmitter power in watts. This limit would specifically apply to base transmitter units in the guard bands adjacent to the public safety mobile receive band.

Motorola PMRS Proposal: Motorola proposes that PMRS systems operating in the guard bands comply with the emission limits found in section 90.543 of the FCC's rules. Section 90.543(c) states that the power of any emission must be reduced below the unmodulated carrier power (P) by at least 43 + 10 log (P) dB. Assuming this measurement is made in a 30kHz bandwidth, it is equivalent to requiring an attenuation of 50 + 10 log (P) in a 6.25 kHz bandwidth.

Comparison: FreeSpace's proposed out-of-band emissions limits represents an increase in attenuation of 37dB over Motorola's proposal, and is also more stringent than the rule proposed by the FCC in its *Notice of Proposed Rulemaking*, at ¶ 69, in this proceeding.

Frequency Coordination

FreeSpace Proposal: Like Motorola, FreeSpace supports the adoption of a requirement that licensees of the guard bands comply with frequency coordination procedures developed in conjunction with the public safety community. In addition, FreeSpace supports the proposal the Federal Law Enforcement Wireless Users Group (FLEWUG) has made to develop a common coordinator database to facilitate frequency coordination.

Motorola PMRS Proposal: Motorola has proposed that PMRS services operating in the guard bands comply with frequency coordination procedures developed in conjunction with the public safety community.

Comparison: Both FreeSpace and Motorola support frequency coordination to protect pubic safety. FreeSpace also supports the adoption of a common coordinator database as recommended by the FLEWUG.

Other Interference Safeguards

FreeSpace Proposal: FreeSpace has proposed that the Commission require the use of active power control in the guard bands adjacent to public safety spectrum to further reduce the opportunity for interference to occur. It has also proposed a restriction barring the use of direct sequence spread spectrum systems to ensure that the aggregate power of multiple guard band units will never exceed the specified power spectral density limits for a single unit.

Motorola PMRS Proposal: Motorola has not proposed these additional interference safeguards. Rather, it relies on the use of the guard bands by PMRS, subject to the power and emissions limits and frequency coordination measures described above, to protect public safety communications.

Base-to-Base and Mobile-to-Mobile Interference

FreeSpace Proposal: FreeSpace supports a restriction prohibiting base unit transmissions in the guard band spectrum adjacent to the public safety base receive band. Likewise, FreeSpace supports a restriction prohibiting mobile transmissions in the guard band spectrum adjacent to the public safety receive band. These restrictions prevent base-to-base and mobile-to-mobile interferece between the FreeSpace system and public safety.

Motorola Proposal: Motorola's initial proposed Part 27 rules would have allowed PMRS mobile transmit to be adjacent to public safety mobile receive.[2] In its December 13 filing, however, Motorola's proposed Part 27 rules allow PMRS base transmit adjacent to public safety base receive.[3]

Comparison: FreeSpace's restrictions are superior because they eliminate two modes of possible interference, base-to-base and mobile-to-mobile. Motorola's rules would always allow one of these two modes to exist and cause interference.

Base-to-Mobile Interference and Deployment of Base Stations

FreeSpace Proposal: FreeSpace's proposal will prevent its base station transmitters from interfering with public safety mobile receive units. FreeSpace base units will be required to comply with the very strict out-of-band emissions limits described above. In addition, FreeSpace base units will be installed outdoors in fixed, immobile locations. FreeSpace will know the precise location of each base unit and will have complete network control over its base units at all times from its network operations center. Furthermore, FreeSpace would use the frequency coordination process in siting these base units, as described in a previous filing.

Motorola PMRS Proposal: Motorola relies on frequency coordination as well as its proposed power and out-of-band emissions limits to protect public safety mobile units.

Comparison: FreeSpace believes its proposal provides interference protection for public safety mobile units that equals or exceeds the Motorola proposal. It supports power limits and out-of-band emissions limits that are far more stringent than the limits proposed by Motorola. It also will use the frequency coordination process to locate its base stations in a manner that will protect public safety mobile units.

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[2] *See* Letter of Leigh Chinitz, Motorola, WT Docket No. 99-168 (filed Dec. 2, 1999).

[3] *See* Letter of Steve Sharkey, Motorola, WT Docket No. 99-168 (filed Dec. 2, 1999).

It appears that some parties assume that, under the Motorola proposal, private radio systems would be deployed to cover only discrete geographic areas and users. But no where in Motorola's proposed guard band rules would this be required. Indeed, the "band manager" concept that Motorola has proposed would be a new approach to licensing the spectrum, and could result in scenarios not being anticipated by the public safety community. If the Commission adopts the Motorola proposal, it is not clear how it would define who would be eligible to bid for the guard band frequencies as a "band manager." In a recent letter to Congressman Bliley, Chairman Kennard, in describing the band manager proposals in this proceeding, stated that band managers "would assign frequencies to end-users and provide spectrum management functions on a for-profit basis. Some commenters have proposed that Band Managers also be permitted to lease spectrum to operators of systems that provide internal communications services to end-users. Pursuant to these proposals, entities leasing the spectrum in this manner would provide a for-profit communications service in the traditional sense ...."[4]

It would consequently appear that these "traditional," for-profit entities would have an incentive to maximize the revenues they receive in relicensing the spectrum for private radio use. To maximize their returns from buying their spectrum licenses, winning band managers could very well try to maximize the number of users authorized to transmit on each channel or to maximize the amount of information transmitted. Winning band managers will also have an incentive to use the spectrum pervasively across the license territory. This is far different than a scenario in which PMRS is deployed in only discrete areas.

It is with these realistic band manager incentives in mind that the Commission and the public safety community should compare the FreeSpace and Motorola proposals. FreeSpace supports far more stringent power limits, out-of-band emissions limits, and other safeguards compared to the Motorola proposal. It is for this reason that FreeSpace believes its proposal provides interference protection that equals or exceeds Motorola's proposal.

[4] Letter of Chairman William E. Kennard to Congressman Bliley, Dec. 21, 1999.